# Chapter 5a  Create-View-Draw Profiles

This chapter will illustrate a number of methods to create, view, and draw profiles.  Specific Methods to be shown include:

- Creating profile strings using the Mdot Create-Draw Profile.exe
- Creating profile strings using an INPUT file
- Creating and Viewing profiles using the Profile Viewer
- Drawing roll-profiles using an INPUT file
- Drawing a profile using MDOT Create-Draw Profile.exe

Which method you use depends mainly on your personal preference, except when it comes time to produce drawings for translation to MicroStation.  For specifics on that procedure, please refer to *Chapter 19 - Create Drawings For Translation To MicroStation*

A brief discussion of the advantages and disadvantages of each method follows:

**Creating a profile drawing using MDOT Create-Draw Profile.exe** - This method uses an MDOT Add-In application to create profile drawings.  ***Its use is required to create drawings for transfer to MicroStation.***

> *Advantages:* This add-in will always be written to meet our MicroStation drawing translation requirements, and any future procedures will be based on using this Add-In.  It's quick and easy, and can produce drawings of a known paper size for plotting or translation to Settings used in previous sessions are recalled each time the wizard is used.  This add-in also produces an input file that can be tweaked if necessary to accommodate a proposed design, and will cut existing ground profile string.
> *Disadvantages:*  The INPUT file created by this add-in is in a specified format and only the file can be changed by the user as necessary, not the program itself.

**Creating With INPUT File** - With this method, a file is created for each alignment to cut the sections relative to that alignment.  Can be combined with a drawing INPUT file as well.

> *Advantages:*  Speed, portability with other MOSS/MX versions, ability to code in housekeeping activities such as deleting specific profile strings before attempting to recreate them.
> *Disadvantages:*  Once profile string is created, another input file or add-in must be used to create a drawing so it can be viewed.

**Creating And Viewing With Profile Viewer** - It allows you to easily create and view profile sections, and save these settings to quickly regenerate profiles as the design changes.

> *Advantages:*  This module allows you to cut and dynamically view profiles without the need to create a drawing.  Allows simultaneous viewing of plan and profile information for an alignment.  Allows you to compare two profiles to find elevation differences, cross slopes, etc. without having to generate MX reports.
> *Disadvantages*:  Must delete existing ground profile strings before the final step of the Profile Viewer procedure so that the new profile string label is what is specified, and not automatically incremented to the next available string label.

**Drawing Profiles using an INPUT file** - MDOT has created a variety of master INPUT files for creating profile drawings at different points in the design process.

*Advantages:*   As with the files that create profiles, INPUT files offer speed, and portability with other MOSS/MX versions.  The drawing INPUT file lines can be combined with the create profile coding to make a single file that both creates and draws profile drawings.

*Disadvantages:*  Current MDOT Master INPUT files that draw profiles are not current with the color and line style requirements for translating these drawings to MicroStation and haven't been optimized to produce drawings in a color scheme suitable for plotting on the plotters that MDOT uses today.  It's difficult to determine whether a profile drawing created in this manner can physically fit on the paper available in our plotter, or what page size would actually be required to create the plot.   These files will be not be used to meet our MicroStation translation standards.

## Creating Profile Strings With An INPUT File

The Maine DOT master INPUT file for creating and drawing profiles is:

**CD-LS-MC10.INP**  (Create-Draw-Longsection-MC10.INP)

The Command Language used to generate the existing profile string LC10 through a triangulation string TRIA under alignment MC10 is very straightforward:

```
SECTION,TRIANGLES,DESIGN
SECTION,PROFMC10
177,MC10,TRIA,LC10
999
```

The first line invokes Major Option SECTION, and indicates the model to be sectioned (TRIANGLES), followed by the model containing the reference string (DESIGN).

```
SECTION,TRIANGLES,DESIGN
```

The second line specifies the model to contain the new profile string being created (PROFMC10).

```
SECTION,PROFMC10
```

Minor Option 177 cuts a profile relative to a Master String through a Triangulation.  It's in the form of Reference String Label (MC10), Triangulation String Label (TRIA), and String To Be Created (LC10).

```
177,MC10,TRIA,LC10
```

Minor Option 999 ends Major Option SECTION.

```
999
```

The file CD-LS-MC10.INP also has code in it to create a drawing, but that will be described later in this chapter.

## Creating And Viewing Profiles With The Profile Viewer

The **Profile Viewer** is used to create long section strings, and to examine the relationships between strings in profile.  It can be used to assess elevation differences between a centerline and a section through the existing terrain model, to check cut and fill, and to inspect cross slopes and widening on roadway strings.  ***The following instructions are based upon the Reference string already having vertical design applied to it.***

> NOTE:  The Profile Viewer is a dockable window, which will allow you to view both plan and profile information simultaneously in the MX Graphics Display.  For more information on how to dock and undock the Profile Viewer, please refer to User Note DCK-1 - Docking the Profile and Cross Section Viewers.

The procedure for Creating and Viewing Profiles with the Profile Viewer is as follows:

**Step 1** - From the *Analysis* menu, select *Sections -> Profiles.*

The **Profile Viewer** is displayed.
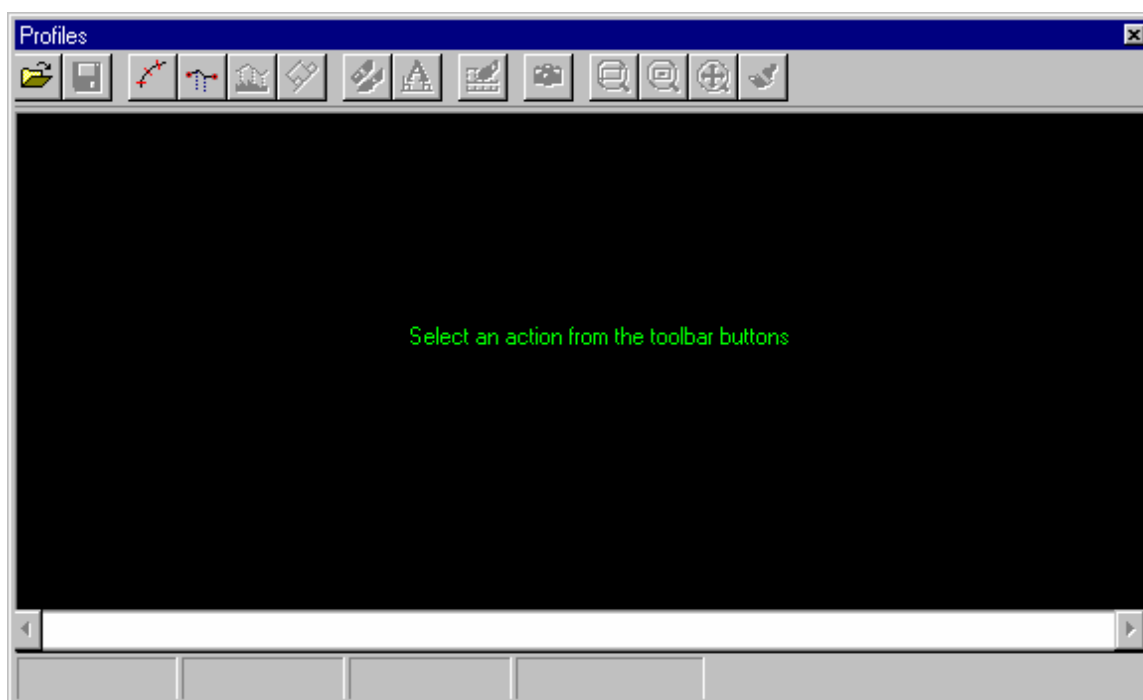


The Profile Viewer has three distinct areas:  a toolbar containing icons for all the options available within the viewer, a graphics area in which the profiles are displayed, and a station selector.  When the panel first opens, only three options are available;
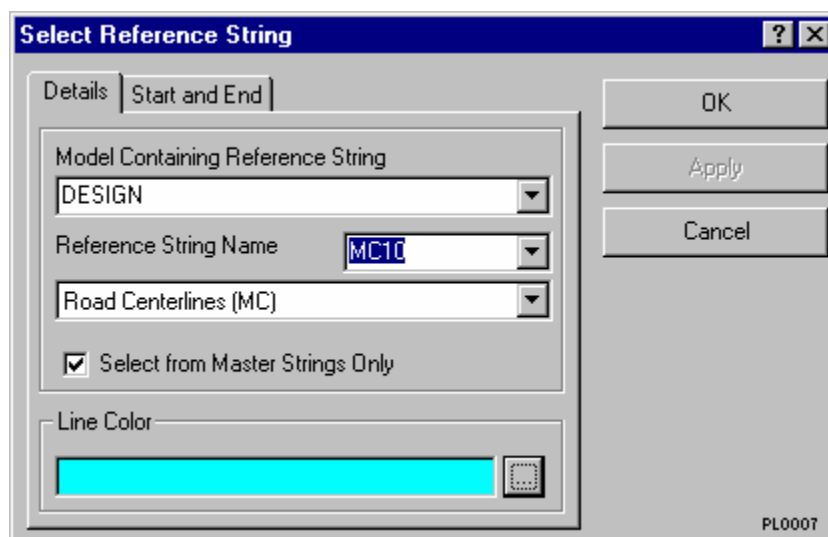
*Open Settings*, *Select Reference String*, and *Profile Between 2 Points*.

# **mdot mx**

**Step 2** - Click the **Select Reference String** icon.
The Select Reference String panel is displayed.  This panel allows you to specify the reference string and the color to be used to draw it.

In the example illustrated above, the *Model Containing Reference String* is DESIGN, and the Reference String label is MC10.  If you would like to limit the length along an alignment that will be analyzed with this wizard, you can set start and end points on the Start and End Tab.

**Step 3** - Fill out the panel as desired, then Click **OK**.

The reference string is displayed in profile in the Profile Viewer.  Notice the information displayed in both the title bar and the status bar at the foot of the viewer.   Ensure that the viewer has focus, and run your cursor along the toolbar icons to see what options are available, then use the horizontal scroll bar or the station selector at the bottom of the panel to move along the string.
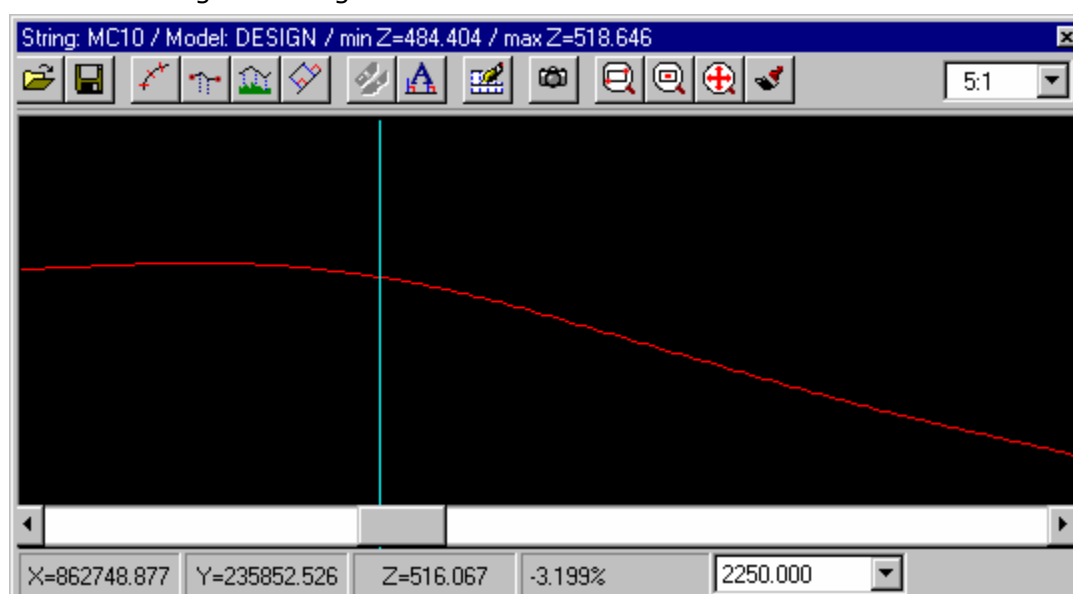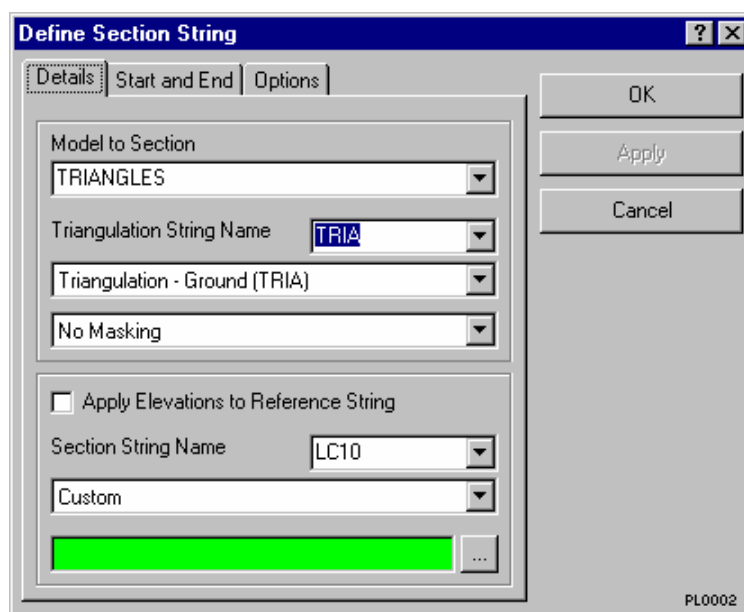
You should notice a vertical line in the Viewer indicating your position along the Reference String.  Also notice that a point indicator can be seen in your plan view display showing the current point both in plan and profile:
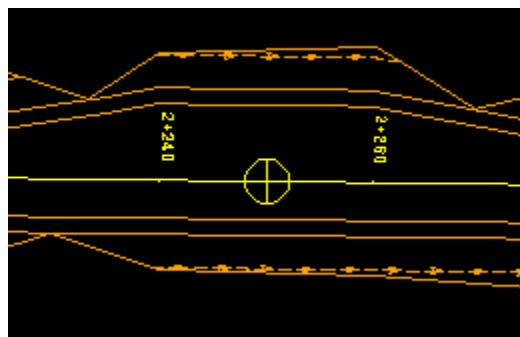


**Step 4** -  Click the ***Create Section String*** icon.  This will allow you to create an existing ground profile string.

The **Define Section String** panel is displayed.



In the example shown above, we are creating an existing profile string through our TRIANGLES Model and using triangulation string TRIA.  The long section string LC10 will be created.  Don't worry about which model we wish to put LC10 in at this point in the wizard. In using the Profile Viewer, this is the last step of the procedure.  As with the previous panel concerning the reference string, we can limit the area along our alignment where the existing ground section is cut.  If you select a string model to section rather than a triangulation model, you must ensure that the density of data is sufficient to define the section adequately. If the density is low, you can use the third tab on this panel and invoke secondary interpolation, which is a process that takes the elevation of surrounding points into account.

![mdot mx logo]

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*NOTE: To apply the elevations on the profile to existing points on the reference string, check the Apply Elevations to Reference String box on the Details tab. This effectively lays the reference string on the model through which you are taking the profile. When you select this option, no profile string is created.*

Once you've filled in the appropriate tabs on this panel, Click **OK**.

The profile of the existing ground along the reference string is displayed in the Profile Viewer.
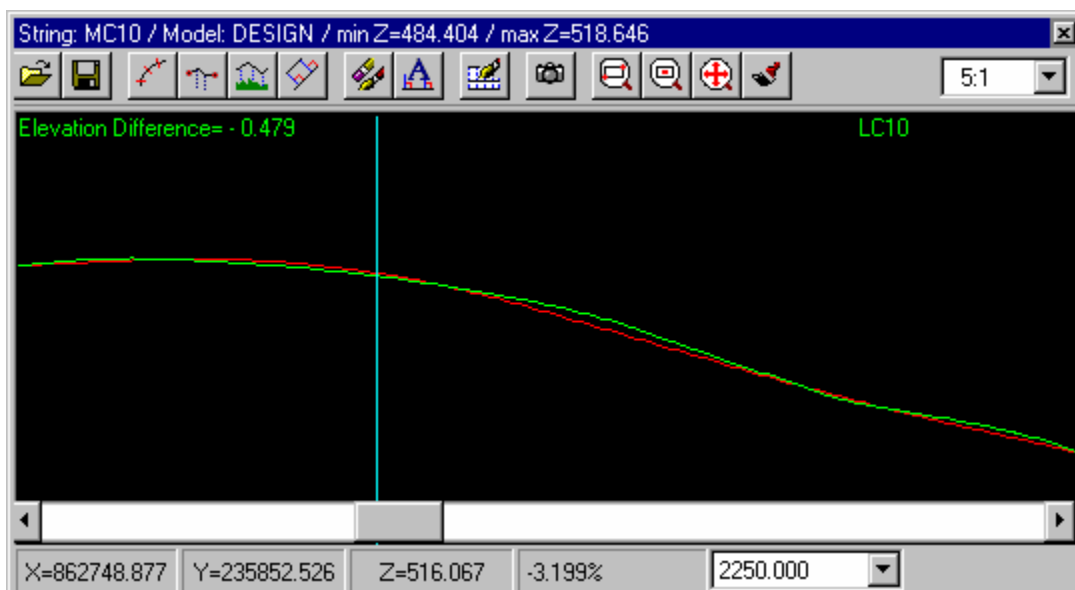


**Step 5** - Click the **Display Associated String** icon ![icon].

*This step is only necessary if you have other strings which you want to show in profile in addition to the reference and existing profile strings such as gutterlines, edge of traveled way, etc.*

When this icon is clicked, the **Display Associated String** panel is displayed.



Select the string to be displayed, then click **OK**.

In the example illustrated, we want to show the Roadway Edge (Traveled Way) string on the left side of the alignment in the profile viewer.

---
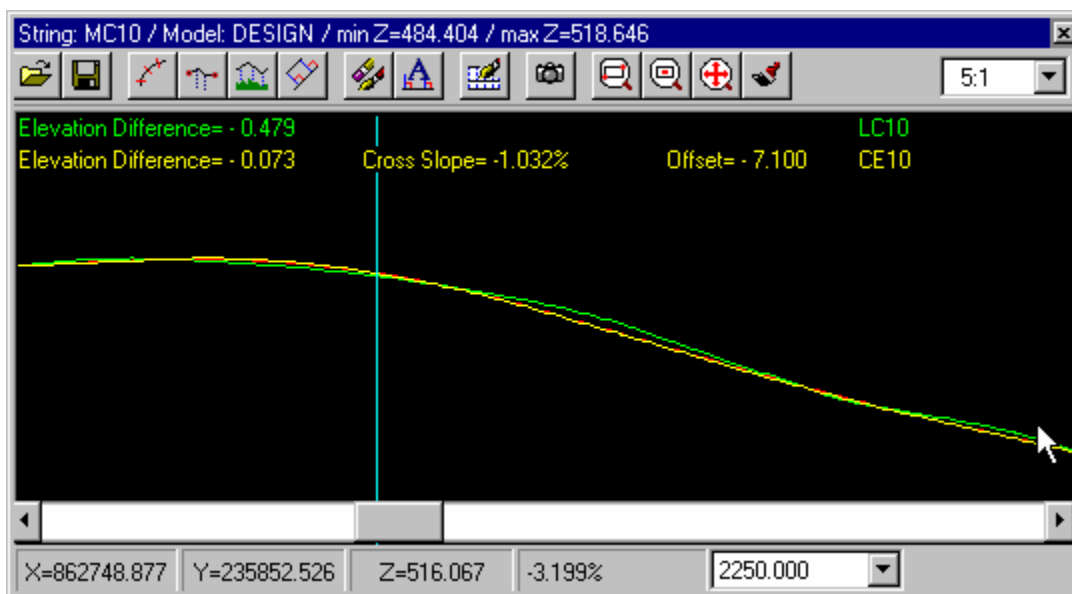
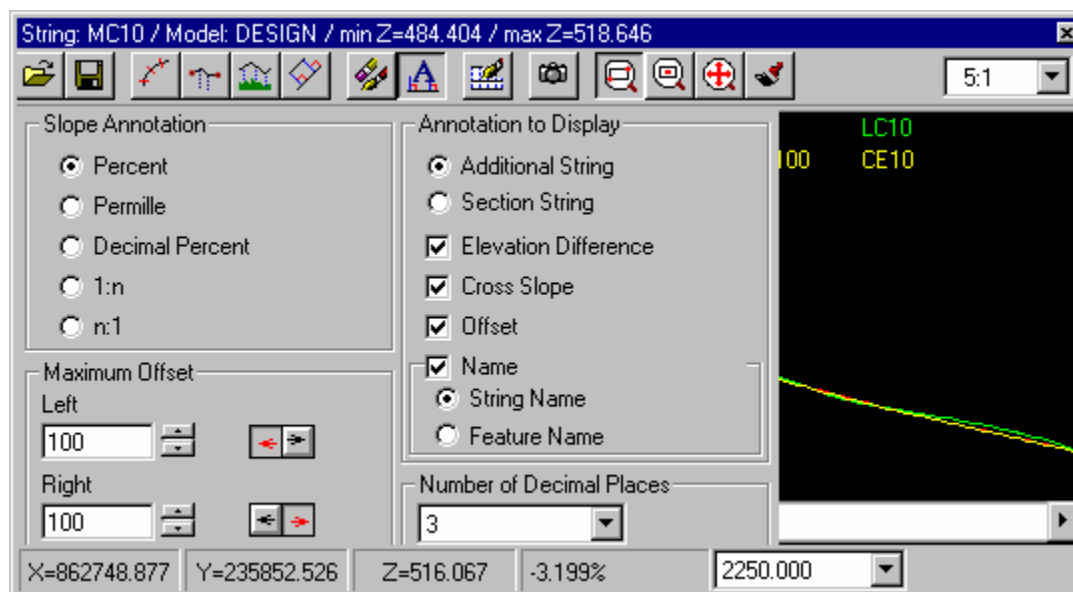At this scale, it looks almost coincident with that of the reference string because it is at a very small vertical offset from centerline. To see the elevation difference more clearly you can either:

- change the vertical exaggeration of the profile viewer [ 5:1 ▼ ] _or_
- use the zoom functions [🔍🔍🔍🖌] .

**Step 6** - Click the ***Annotate Between Strings*** [A] icon. An attached panel is displayed.



Notice that the *Elevation Difference, Cross Slope, Offset*, and *Name* boxes are checked for the additional string, and that these values are displayed in the appropriate color at the top of the viewer for the current station. Click ***anywhere in the viewer*** to remove the attached panel, or click the ***Annotate Between Strings*** icon a second time.

**Step 7 (optional)** - Click the **Tracking** icon. 🎥

Tracking is a section viewer operating mode that will dynamically update the viewer as you move your cursor along the reference string in plan view.  The station indicator (vertical cyan line in the viewer) moves along the profile as you move the cursor in plan view, the displayed values changing with every move.  Alternatively you could use the scroll bar or list box to move the station indicator along the profile.
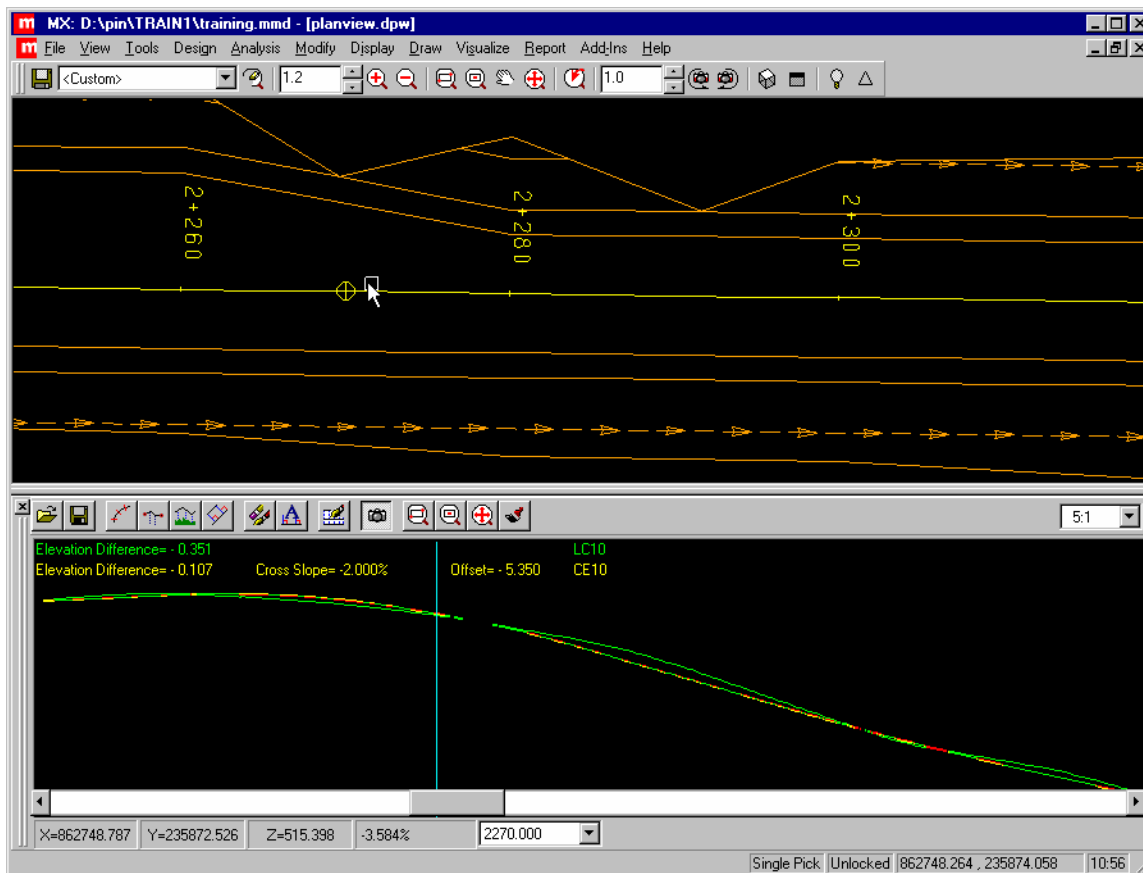


*Profile Viewer in Tracking Mode - Docked in MX Display*

**Step 8** - Click the **Save Settings** icon 🖫 in the profile viewer toolbar.

This will allow you to save the viewer settings for the current reference string for later use. This will create a "*.LSU" file in the default location.  Use a descriptive name for this file such as DESIGN-LC10.LSU for the example shown in this chapter.
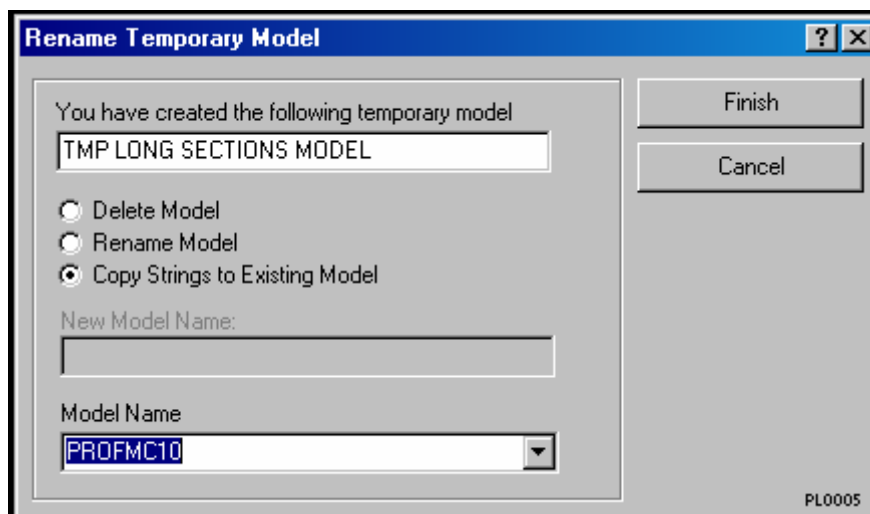
**Step 9** - Close the Viewer by clicking on the **"X"** in the upper right-hand corner.

The **Rename Temporary Model** panel is displayed.

This panel allows you to save the profiles you have created, which is necessary to use the MDOT Draw Profile Plots Wizard to create a paged profile drawing for plotting or translation to MicroStation.

Select Copy Strings To Existing Model, and choose the model to put the long section string(s) into.

**Rename Temporary Model**

You have created the following temporary model

TMP LONG SECTIONS MODEL

○ Delete Model
○ Rename Model
● Copy Strings to Existing Model

New Model Name:

Model Name

PROFMC10

Finish

Cancel

PL0005

NOTE:  If you have used the profile viewer to create an existing profile string previously, or created the string in some other manner such as an input file, *you must first delete the existing string from the section model before attempting to copy this new string into it*.  If you don't, then MX will create a second string with an incremented string label (i.e. what you think is LC10 will be created as LC11).   Click Cancel on this panel to return to the Section Viewer, and while the viewer is still running, you can select Modify => Edit Strings => Delete String(s) from the Main MX Menubar.  Once this is accomplished, Repeat Step 9 of this procedure.

Click *Finish*.

## Drawing Profiles Using an INPUT File

As described earlier in this chapter, a variety of master INPUT files have been developed for creating profile drawings at MDOT.  Instructions for editing them to fit your design are provided within the files themselves, so they won't be detailed here.  A brief description of the profile-related drawing INPUT files are listed below:

**CD-LS-MC10.INP** - described earlier in this chapter, this file both creates and draws a profile string along with the reference string it was created from.

**CD-VERAT-MC10.INP** - This master file creates a drawing similar to CD-LS-MC10.INP, but doesn't cut a profile string.  Instead, it has a section in it to design the vertical geometry of the master string MC10 using Major Option VERAT.  Major Option VERAT will be described in detail in the next chapter.

**CD-VCUSP-MC10.INP** - Very similar to the file CD-VERAT-MC10.inp, this file also defines the vertical geometry of the reference string, but uses Major Option VCUSP instead of VERAT.

## Creating a profile drawing using MDOT Create-Draw Profile.exe

This Add-In was created to provide a quick and easy means to create paged profile drawings with existing ground and proposed alignment profiles, particularly for new MX users who haven't yet become comfortable with INPUT files. The second purpose of this add-in is to create paged profile drawings in a format that's easily transferred to MicroStation using the MXChange translator.

NOTE: This add-in **must be used to create profile drawings for transfer to MicroStation** with MXChange. If not used, the MicroStation automation routines will not work properly.

Fill out the Design Model and Reference String names, and the model that contains the existing ground profile (LCxx). If you have not yet created a ground profile string, or have changed your horizontal alignment and wish to cut it again, this wizard will do it for you. Simply click the Create New Profile String check box, and you'll have an opportunity to select the existing ground surface to be sectioned.

*In this example, we are creating a new existing ground profile string (LC10) by cutting triangulation string TRIA contained in our TRIANGLES(TRIA) model.*

The new profile string will be automatically named based on the M-String label provided in the top of the panel:

*MC10 creates LC10*
*MC20 creates LC20*
*MCA1 creates LCA1*
*Etc.*

1) **Select Draw => MDOT Create Draw Profile** from the menu bar.



2) **Fill in Design Model Name** (Ex: DESIGN)

3) **Fill in M-String Name** (Ex: MC10)

4) **Fill in Section Model Name** (PROFMC10)

5) **Check to Create New Profile String**

6) **Fill in Existing Triangle Model** (TRIANGLES (TRIA))

7) **Fill in Triangulation String Name** (TRIA)

8) **Click Next** To Continue

This creates an LC10, which is a profile string of the existing ground surface. When the next panel appears, the user can choose to create a plot of the existing ground profile or cancel the panel at this time. Many designers find that creating a plot at this time is helpful when trying to determined vertical curve information.

The second panel as shown below, is used to create the profile sheets.

### Type of Profile Drawing

*Existing Only* - This will only draw the existing profile based on the stationing of the M-String.

*Existing And Proposed* - This will draw the existing profile, proposed profile, and will annotate the vertical geometry of the proposed profile.  It will annotate VPC's and VPT's, VPI's, and grades.

*Exist/Prop. W/o Geom* - this will draw the existing profile and proposed profile but will not attempt to annotate the vertical geometry.  Must be used if G-String contains Null Elevations but you want to see proposed profile in drawing.



### Color Scheme

*Plotting* - This color scheme is optimized to produce drawings that plot well.

*Microstation* - This color scheme is designed specifically to produce drawings that will be translated to MicroStation and processed by macros in the MicroStation environment.

PubHear – This color scheme is valid for the creation of long profiles.  These are the drawings used by the Public Hearings section.

### Scale

*Horizontal* and *Vertical Scales* and *Sheet Overlap* are pretty much self-explanatory.

*Notice when you change the Horizontal Scale or Sheet Overlap that the calculated number of pages for each page size listed in the table will change.*

### Add Title Info and User Name

*Title Info* - will be annotated on each sheet of the resulting profile drawing.  It's a good idea to list the route number or street name, as well as the MX M-String label.

*User Name* - this will be annotated in the lower right hand corner of each sheet when the Plotting color scheme is selected.  It allows people to readily identify that these plots belong to you when you submit them to the plotter.

***Select the page size***: The table in the middle of the panel shows the standard page sizes available for profiles in the left column, and the approximate number of pages that will be created to fit your alignment at the specified horizontal scale.  ***If you want to use a custom page length, double click on the word "Custom"***.  You will be prompted to enter a custom sheet length in centimeters,(even for the US Customary projects).  Once you enter it, the wizard will tell you how many sheets it will take to draw a profile on that page size.

| Sheet Size | Number Of Sheets |
|---|---|
| PlanSht | 5.53 |
| Roll05 | 2.69 |
| Roll10 | 1.28 |
| Roll15 | .85 |
| Roll20 | .63 |
| Custom | |

***Click on the appropriate row in the table to highlight the desired page size.***

With all of the information filled in click **Next**

The drawings will process and once completed, click the Cancel button to close the drawing panel.  Follow standards procedures to send your drawings to the plotter.